

Draft Technical Staff Report

**Evidence in support of an
Amendment to the
*Water Quality Control Plan for the Coastal Watersheds
of Los Angeles and Ventura Counties*
to Prohibit On-site Wastewater Disposal Systems
in the Malibu Civic Center Area**

~~July 31~~October 21, 2009

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State of California
California Regional Water Quality Control Board, Los Angeles Region

Draft Technical Staff Report

Evidence in support of an
Amendment to the
*Water Quality Control Plan for the Coastal Watersheds
of Los Angeles and Ventura Counties*
to Prohibit On-site Wastewater Disposal Systems
in the Malibu Civic Center Area

Technical Staff Report

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State of California
California Regional Water Quality Control Board, Los Angeles Region

Draft Technical Staff Report

**Evidence in support of an
Amendment to the
*Water Quality Control Plan for the Coastal Watersheds
of Los Angeles and Ventura Counties*
to ~~incorporate a~~ **Prohibition on** On-site Wastewater Disposal Systems
in the Malibu Civic Center Area**

Technical Staff Report

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Technical Staff Report – Overview

Introduction

The purpose of this Technical Staff Report is to present evidence in support of an amendment to the *Water Quality Control Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (Basin Plan)*, to prohibit subsurface disposal systems (on-site wastewater disposal systems, or OWDSs), used in a developed and developing portion of the Malibu coast along the Santa Monica Bay in the Malibu Civic Center area. The Malibu Civic Center area, shown in Figure 1, includes Malibu Valley, Winter Canyon, and the adjacent coastal strips of land and beaches. This area, referred to as ~~Types of subsurface disposal systems that would be prohibited by the amendment to the Basin Plan range from passive systems with conventional septic tanks to active systems that more aggressively remove pollutant loads from sewage before subsurface disposal. The prohibition would apply to systems that serve individual properties (residential, commercial, industrial, and public properties) as well as groups of those properties. Collectively throughout this report, these disposal systems are referred to as on-site wastewater disposal systems, or OWDSs.~~

Environmental Setting

Background

~~The Malibu Civic Center area (Figure 1),~~ has a residential population estimated at almost 2,000. The area also serves ~~as supports a population of about 1,000 residents and is the core of the City of Malibu's business, cultural, and commercial activities, and the population estimate of 2,000 does not include significant daytime and evening workers and visitors who travel to the area – in particular, visitors to the~~ . ~~The area, which includes the~~ renowned Surfrider Beach,¹ attracts a high volume of visitors.

Without community sewers and wastewater treatment infrastructure, residents, businesses, and public facilities in the City of Malibu use thousands of on-site disposal systems to discharge their sewage to the subsurface and underlying groundwater. In several areas of the City, high flows of wastewaters coupled with unfavorable hydrogeologic conditions ~~coupled with high flows of wastewaters~~ have raised concerns about reliance on this wastewater disposal strategy. In one of those areas ~~of concern, namely~~ the Malibu Civic Center area, relatively intensive land use activities by almost more than 400 dischargers result in the release of wastewaters to the subsurface at a rate that Regional Board staff estimates to be as high as 270~~55~~,000 gallons per day (gpd).

¹ The population estimate of 2,000 does not include daytime and evening workers who are employed in the Malibu Civic Center area, and daytime and evening visitors who enjoy the beaches and patronize the businesses and public facilities in the area, and that the visitor population to Malibu area beaches (not limited to the area within the prohibition boundary) has substantially increased, from 233,500 per month in August of 1999 to 355,000 per month in August of 2006.



Figure 1

Description of the Proposed Prohibition

Prohibition Boundary

The area that would be affected by the proposed prohibition is referred to as the Malibu Civic Center area, and is delineated by the red line shown in Figure 1. The area is not defined according to municipal borders or parcel lines. Rather, the area subject to the prohibition is delineated according to hydrogeologic parameters and drainage patterns; as groundwater flow roughly mimics surface drainage, the prohibition boundary follows a topographic high surrounding both the Winter Canyon and lower Malibu Creek (also known as Malibu Valley) watersheds. All property extending seaward of this boundary to the ocean is subject to the prohibition, including the coastal strips along the Pacific Coast Highway stretching from Amarillo Beach to First Point at Surfrider Beach. This entire area, which is referred to as the

“Malibu Civic Center area,”² totals 2.2 square miles of which 1.5 square miles and 0.7 square miles are within the City of Malibu and the unincorporated area of County of Los Angeles, respectively. Figure 2 shows the civil boundaries and parcels.

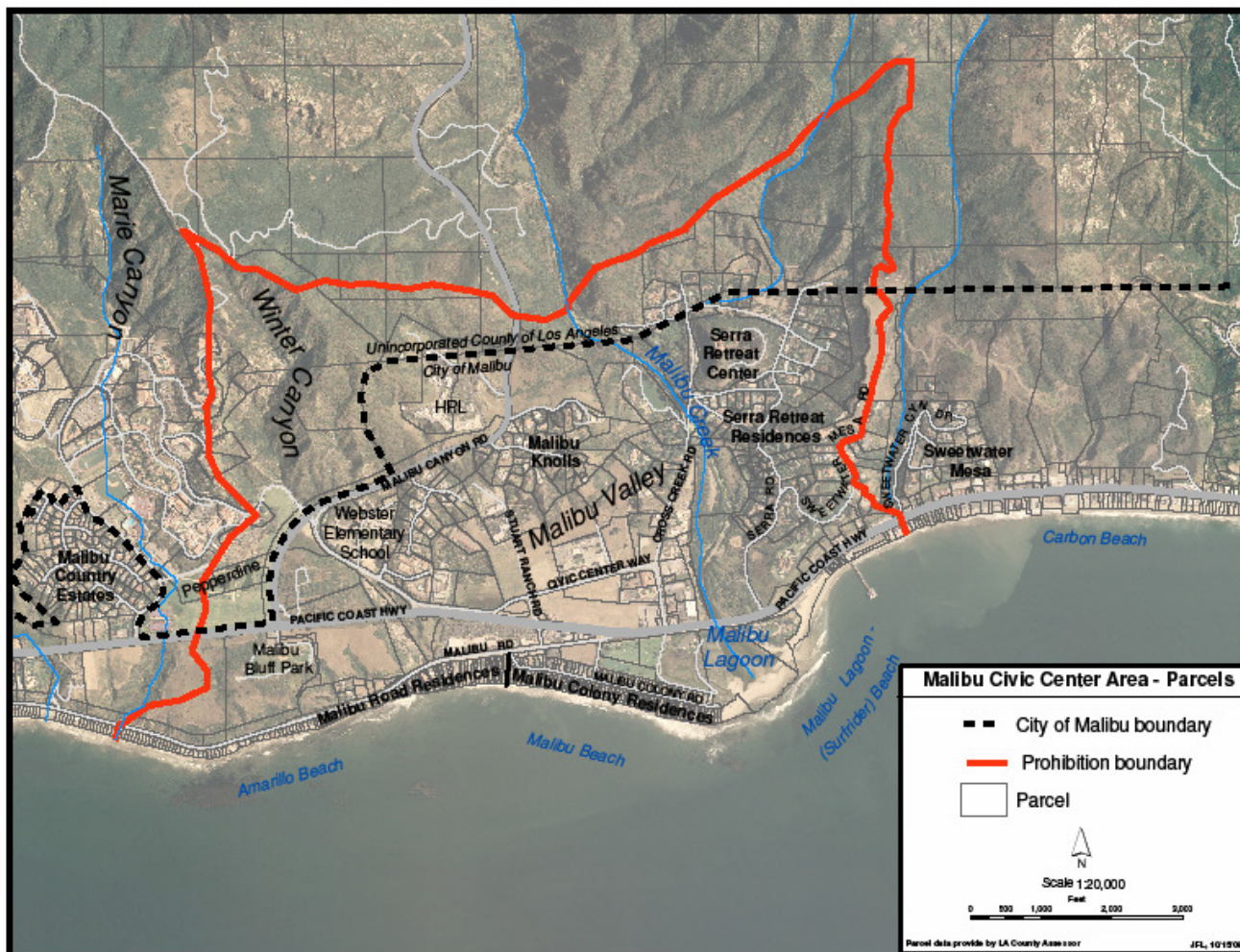


Figure 2

To the west, the prohibition boundary encompasses Winter Canyon not only because this watershed is heavily developed and discharges almost 50,000 gallons per day of wastewater (about 20% of the wastewater in the prohibition area), but also because wastewater management strategies for many commercial activities in the coastal strip adjacent to the Colony – as well as proposed strategies for managing future wastewaters from Malibu Valley – rely on disposal capacity in Winter Canyon, which is severely strained. Note that the prohibition area includes

² As the prohibition area covers a small portion of the City of Malibu and an even smaller portion of unincorporated County of Los Angeles, staff avoided designating this as a ‘Malibu’ prohibition. Nor did staff select hydrologic terms to designate the prohibition area, out of concern that such terminology may not be readily recognized by the affected community. Rather, the designation of ‘Malibu Civic Center area’ was selected for broad name recognition.

only a small sliver of the Pepperdine University campus, as this sliver is the only portion of Pepperdine that falls within the topographically-defined Winter Canyon watershed.

To the east, the prohibition boundary encompasses the Serra Retreat neighborhood, and follows Sweetwater Mesa Road along the eastern topographic high. The boundary was not extended eastward, as the Sweetwater Mesa neighborhood is a lower density residential development. Nor was the boundary extended eastward along the Pacific Coast Highway to capture a stretch of significant commercial development, as the intent of this proposed regulatory action is encompass priority areas that affect groundwater and are hydraulically connected to impaired surface water resources, including Surfrider, Malibu, and Amarillo Beaches and Malibu Lagoon. Additional areas, such as the stretch of the Pacific Coast Highway eastward of the boundary, may be subject to future regulatory actions.

Types of Dischargers Subject to Prohibition

Figure 2 is a parcel map of the prohibition area. All property owners, including existing residences, businesses, and public facilities that discharge wastes through an OWDS in the Malibu Civic Center area, would be affected by the proposed prohibition as well as future dischargers who may plan to discharge in this area. The regulatory action would immediately prohibit all new discharges from OWDS in the Malibu Civic Center area, and establish a schedule to cease discharges from existing systems by 2014.³

Types of Discharges Subject to Prohibition

Collectively, the systems from which wastewaters discharge are referred to as OWDSs. Types of subsurface disposal systems, or OWDSs, that would be prohibited range from passive systems with conventional septic tanks to active systems with equipment that more aggressively remove pollutant loads from sewage before subsurface disposal. The prohibition would cover an OWDS that serves an individual property (residential, commercial, industrial, and public properties) as well as a group of properties. The prohibition would apply to all OWDSs and regulated discharges (whether they are regulated by the City of Malibu, County of Los Angeles, or State) as well as any unregulated discharges that may exist.

Water Resources

Surface Waters and Groundwater

Surface waters in the Malibu Civic Center area include Malibu Creek, Malibu Lagoon —(a fresh/saltwater habitat ~~for used by numerous species, some rare, threatened, and endangered~~) ~~species~~, and ocean beaches, which are heavily used by ~~the residents population~~ as well as visitors.

³ ~~An exemption would allow for “zero discharge” projects if a discharger can demonstrate, to the satisfaction of the Executive Officer, that reuse, evaporation, and/or transpiration will use 100% of the wastewater generated by activities on a site, will not contribute to a rise in the water table, and will contain and properly handle any brines and/or off-specification wastewaters that cannot be reused/discharged in a manner that meets water quality objectives established in the Basin Plan.~~

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Groundwater in the area ~~was a~~ historically used as a source of drinking water, and ~~is a~~ potential source of drinking water for a portion of the community, or a reserve source of drinking water during times of emergency when deliveries of imported supplies of drinking water could be interrupted. In the *Basin Plan*,⁴ the Regional Board has formally designated these plus other beneficial uses for the water resources in the area as follows:

Malibu Lagoon: Navigation; Water Contact Recreation; Non-contact Water Recreation; Estuarine Habitat; Marine Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wetland Habitat.

Malibu Creek: Water Contact Recreation; Non-contact Water Recreation; Warm Freshwater Habitat; Cold Freshwater Habitat; Wildlife Habitat; Rare, Threatened, or Endangered Species Habitat; Migration of Aquatic Organisms; Spawning, Reproduction, and/or Early Development; Wetland Habitat.

Malibu Beach and Malibu Lagoon Beach (Surfrider Beach), Amarillo Beach, and Carbon Beach: Navigation; Water Contact Recreation; Non-contact Water Recreation; Commercial and Sport Fishing; Marine Habitat; Wildlife Habitat; Spawning, Reproduction, and/or Early Development; and Shellfish Harvesting.

Groundwater: Municipal and Domestic Supply (Potential), Industrial Process and Service Supply, and Agricultural Supply.

Also in the *Basin Plan*, the Regional Board has established water quality objectives to protect the beneficial uses identified above.

Impairments to Beneficial Uses of Water Resources

In ~~the~~ 2006 Clean Water Act Section 303(d) list, approved by the United States Environmental Protection Agency (US EPA) on June 28, 2007, impairments to beneficial uses are formally identified for the following water resources:

Malibu Lagoon: impaired by Coliform Bacteria, Eutrophication.

Malibu Creek: impaired by Coliform Bacteria, Nutrients (Algae).

Malibu Beach: impaired by Indicator Bacteria.

Malibu Lagoon Beach (Surfrider Beach): impaired by Coliform Bacteria.

Carbon Beach: impaired by Indicator Bacteria.

To restore water quality and impaired beneficial uses, the US EPA and/or Regional Board have adopted the following Total Maximum Daily Loads (TMDLs):

- a. **Malibu Creek Watershed Nutrient TMDL:** The US EPA, on March 21, 2003, specified a numeric target of 1.0 mg/l for total nitrogen during summer months (April

⁴ Water Quality Control Plan for the Coastal Watersheds of Ventura and Los Angeles Counties, adopted by the Board on June 13, 1994, and as subsequently amended.

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15 to November 15) and a numeric target of 8.0 mg/L for total nitrogen during winter months (November 16 to April 14). Significant sources of the nutrient pollutants include discharges of wastewaters from commercial, public, and residential land use activities. The TMDL specifies a load allocation for on-site wastewater disposal systems (OWDSs) of 6 lbs/day during the summer months and 8 mg/L during winter months.

- b. **Malibu Creek and Lagoon Bacteria TMDL:** The Regional Board specified numeric targets, effective January 24, 2006, based on single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. Sources of bacteria loading include storm water runoff, dry-weather runoff, OWDS on-site wastewater disposal systems, and animal wastes. The TMDL specifies load allocations for on-site wastewater disposal systems equal to the allowable number of exceedance days of the numeric targets. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 to October 31), there are no allowable exceedance days, in winter dry weather (November 1 to March 31), there are three allowable exceedance days, and in wet weather (defined as days with ≥ 0.1 and the three days following the rain event), there are 17 allowable exceedance days.

- c. **Santa Monica Bay Beaches Wet and Dry Bacteria TMDL:** For beaches along the Santa Monica Bay impaired by bacteria in dry and wet weather, the Regional Board specified numeric targets, effective July 15, 2003, based on the single sample and geometric mean bacteria water quality objectives in the *Basin Plan* to protect the water contact recreation use. The dry weather TMDL identified the sources of bacteria loading as dry-weather urban runoff, natural source runoff and groundwater. The wet weather TMDL identified stormwater runoff as a major source. The TMDLs did not provide load allocations for OWDS on-site wastewater disposal systems, meaning that no exceedances of the numeric targets are permissible as a result of discharges from non-point sources, including on-site wastewater disposal systems. There are no allowable exceedance days of the geometric mean numeric targets. For the single sample numeric targets, based on daily sampling, in summer (April 1 to October 31), there are no allowable exceedance days, in winter dry weather (November 1 to March 31), there are three allowable exceedance days, and in wet weather (defined as days with ≥ 0.1 and the three days following the rain event), there are 17 allowable exceedance days.

Summary of Evidence

Staff investigations focused on five areas, the results of which ~~and~~ are presented in five technical memoranda that comprise this staff report, and that meet the requirements of the California Water Code, sections 13280 and 13281⁵ for determination that discharges of OWDSs in the Malibu Civic Center area result in violation of water quality objectives, will impair present

⁵ See appendix for a summary of the findings in the technical staff report, organized by sections in regulatory codes.

or future beneficial uses of water, will cause pollution, nuisance, or contamination, or will unreasonably degrade the quality of any water of the state.

Technical Memorandum #1: Permitted Dischargers Have Poor Records of Compliance with Regional Board Orders.

For the privilege of discharging wastewater to a water of the state (including both surface water and groundwater), dischargers must comply with waste discharge requirements (WDRs) that are specified in Orders issued by the Regional Board. The WDRs generally incorporate monitoring and reporting programs that rely on self-monitoring by dischargers. The reports of self-monitoring are used by the Regional Board to determine compliance and to ensure that the quality of the water into which wastes are discharged is not degraded and that beneficial uses, such as drinking water and swimming (body contact recreation) are protected.

In the Malibu Civic Center area, the Regional Board regulates 20⁴ discharges, all of which are from commercial, industrial, or public facilities. In a review of the compliance records for 20⁶ of the 20⁴ discharges, each dischargers had a record of violations from 2004 through 2008. Among the most serious violations are repeated failures to achieve effluent and flow limits specified in WDRs; in particular, limits for pathogens and nutrients (species of nitrogen and phosphorus) that are identified as pollutants in nearby waters that the Regional Board and EPA have designated as impaired under Clean Water Act section 303(d). Also, several dischargers ‘failed to submit’ monitoring reports, and thus compliance with technical requirements in their WDRs could not be determined.

Among the minor violations included in Table 1-41 in Tech Memo #1 are tardy/late submittal of reports of self-monitoring required by the WDRs and improper certifications of those monitoring reports – e.g. a perjury statement executed by a party not authorized to certify the accuracy of the results on behalf of the discharger, and/or modifications to the language of the perjury statement that is specified in a WDR.

DStaff concludes that dischargers have poor records of compliance with Orders issued by Regional Board, and that discharges are, in general, are not meeting requirements prescribed to protect water quality and beneficial uses.

Technical Memorandum #2: Pathogens and Nitrogen in Wastewaters Impair Underlying Groundwater as a Potential Source of Drinking Water.

Although groundwater in the Malibu Valley Groundwater Basin is not an existing source of drinking water to the community, groundwater was the community’s source of drinking water until the 1960s. Groundwater production in the area gradually ceased as a newly formed special district – Los Angeles County Waterworks District No. 29, Malibu – started delivering imported water to the Malibu area and Topanga Canyon in the early 1960s. As a future resource – and also in the event of a disruption of deliveries of imported water, groundwater in the Malibu Valley Groundwater Basin is an important local resource, which ~~that~~ the community may need to use to

⁶ ~~One discharger, Malibu Lumber, did not commence discharge until April 2009, subsequent to the staff’s evaluation of compliance records. Since commencement of the discharge, this discharger has been in violation of its WDR.~~

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meet a portion of its demand for potable water or in the future event that deliveries of imported water are interrupted during emergencies. The Regional Board recognized this beneficial use, in designating groundwater as a potential source of drinking water in the *Basin Plan*.

To evaluate impacts from OWDSs on groundwater as a potential source of drinking water, staff identified 5947 groundwater wells, all of which were designed and constructed for monitoring the quality of groundwater, and compiled analytical data for pathogen indicators and nitrogen. To examine the extent of impairment of this groundwater for drinking water, staff compiled all available analytical results of sampling for pathogen indicators and nitrogen species during the period April 1999~~July 2002~~ through May~~June~~ 2009 and compared these results with drinking water standards for these pollutants. As summarized in graphs and tables for each well:

- ***Pathogens in Groundwater do not meet the Drinking Water Standard:*** ~~Fifty-four~~ wells, or ~~94~~85% of the ~~47~~59 wells, failed to meet the maximum contaminant level (MCL) for~~had~~ fecal coliform during at least one sampling ~~period~~event. Of the ~~671~~1,016 fecal coliform samples collected from the ~~47~~59 wells during the review period, ~~360~~383 samples (~~54~~38%) tested positive and failed to meet the~~exceeded the maximum contaminant level (MCL)~~ of ~~less than 1.10~~ MPN/100ml (Most Probable Number per 100 milliliters).
- ***Nitrogen in Groundwater does not meet the Drinking Water Standard:*** ~~Fourteen~~Twenty-six wells, or ~~30~~44% of the ~~59~~47 wells, failed to meet the~~had~~ MCL of 10 mg/L for nitrate plus nitrite ~~at levels above the MCL of 10 mg/L~~ (as nitrogen) during at least one sampling event. Of the ~~671~~1,012 samples collected from the ~~47~~59 wells during the review period, ~~322~~400 (~~45~~32%) were above the MCL. Although there is no drinking water standard for ammonia, staff also reviewed analytical data for ammonia in view of the likelihood that the ammonia species of nitrogen will nitrify. Assuming conversion of the ammonia to nitrite or nitrate, ~~These results indicate that, when concentrations of ammonia (converted to nitrogen) are added to concentrations of nitrate and nitrite,~~ 163~~400~~ samples ~~or~~ (~~24~~40%) were above the MCL, and that ~~36~~Twenty-four wells, ~~or~~ (~~51~~%) of the ~~47~~59 wells, had levels above the MCL of 10 mg/L during at least one sampling event.

As indicated by coliform results, pathogens are present in groundwater at levels that elevate the risk of infectious disease should this groundwater be used for potable purposes. As indicated by the nitrogen results, species of nitrogen are present in groundwater at levels that can cause health problems in humans should this groundwater be used for potable purposes. Infants and fetuses are particularly sensitive and can develop methemoglobinemia (blue-baby syndrome) from ingestion of water with nitrate at levels that deplete oxygen in the blood stream.

Technical Memorandum #3: Pathogens in Wastewaters that are in Hydraulic Connection with Beaches are a Significant Source of Impairment to Water Contact Recreation.

Malibu Creek, Malibu Lagoon, and nearby beaches are popular not only within the local community but as a destination for visitors as well. In the *Basin Plan*, the Regional Board has designated these waters for both water contact recreation (e.g. swimming) and non-contact water recreation (e.g. sunbathing, aesthetic enjoyment), and set standards at levels that will protect human health.

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As determined by the Regional Board and US Environmental Protection Agency, surface waters in the Malibu Creek Civic Center area are impaired for water contact recreation, consistently failing to meet standards set to protect swimmers and surfers from infectious disease resulting from direct exposure to or incidental ingestion of polluted waters during recreation. Repeated failures to meet standards ~~for standards~~ have resulted in a ‘beach bummer’⁷ reputation for the renowned Surfrider Beach.

~~To examine the hydraulic connection of discharges from OWDSs through groundwater to nearby surface waters, staff evaluated more than 8,000 samples of wastewater effluent, underlying or nearby groundwater, and surface waters. Staff determined that pathogens from wastewaters migrate to surface waters and that, consistent with data supporting the designations of impairments, the levels of pathogens do not meet standards protective of human health. Staff also determined that risks of infectious disease from water contact recreation were elevated at beaches in the Malibu Civic Center area versus comparable beaches with sewers.~~

Historic and recent documentation compiled by the Regional Board, US Environmental Protection Agency, other agencies, and environmental groups and presented in Technical Memo #3 demonstrates that indicators of pathogens in groundwater, surface waters and beaches in the Malibu Creek Civic Center exceed human health standards. Evidence from a 1995 epidemiology study at Surfrider Beach translates this failure to meet water quality criteria into a specific increase in human illness rates: 39 of every 1,000 swimmers at Surfrider Beach are expected to contract gastrointestinal illnesses. This illness rate is in excess of a standard⁸ of 19 illnesses per 1,000 people.

The fecal indicator bacteria, enterococcus, which is shown to discharge from OWDSs into the groundwater, also appears along pathways from the Civic Center through the groundwater basin and beaches to the ocean waves. Well data show enterococcus densities exceed the ocean water quality standard in a majority of wells in the Civic Center area, a significant finding because the City of Malibu previously found that 42% of that groundwater comes from OWDSs and 92% of groundwater (78,000 to 126,000 ft³ per day) enters the water at the beach.

To evaluate possible other sources of pathogens, staff evaluated four years of summer beach data. These data show that enterococcus concentrations at Civic center beaches have consistent trends, suggesting source control through stormwater and OWDS management will be successful, and conflicting with claims that significant amounts of bacteria come from variable sources such as the homeless, birds, or trash.

Staff also reviewed 57 numerous previous studies, and found conclusions from these ~~other~~ studies to be consistent with staff’s determination ~~of that dry weather~~ impairment to the beneficial use of water contact recreation can be attributable to subsurface migration from OWDSs to surface waters.

⁷ ‘Beach Bumpers’ are designated in report cards issued annually by Heal the Bay.

⁸ Environmental Protection Agency (1986), *Ambient Water Quality Criteria for Bacteria* stating “EPA’s evaluation of the bacteriological data indicated that using the fecal coliform group at a maximum geometric mean of 200 per 100 ml, recommended in Quality Criteria for Water, would cause an estimated 8 illnesses per 1,000 swimmers at fresh water beaches and 19 illnesses per 1,000 swimmers at marine beaches.....The E.Coli and enterococci criteria presented in Table 4 were developed using these currently acceptable illness rates (pg. 9).”

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Technical Memorandum #4: Nitrogen Loads in Wastewaters flowing to Malibu Lagoon Are a Significant Source of Impairment to Aquatic Life.

Malibu Lagoon supports a valuable wetland ecosystem and nearby plant communities such as the coastal salt marsh and the coastal strand, and also serves as refuge for migrating birds (with over 200 observed species). These beneficial uses are impaired by excessive nutrients levels in the lagoon, ~~depleting dissolved oxygen in the water and~~ stimulating aquatic growth (algae) and resulting in large daily fluctuations of dissolved oxygen and pH that may increase levels of the highly toxic un-ionized form of ammonia. As established in the nutrient TMDL⁹ adopted by the US EPA on March 21, 2003 for Malibu Lagoon, nitrogen from OWDSs in hydraulic connection with the lagoon are subject to a load allocation of six pounds per day (lb/d).

To quantify current nitrogen loads from OWDSs in the Malibu Civic Center area to the lagoon, staff compiled an inventory of all 38 commercial dischargers and ~~39249~~ residential dischargers. Using real data where available and reasonable assumptions (based on published literature and best professional judgment) for data gaps, staff calculated that the dischargers release about ~~27055~~,000 gpd through OWDSs and estimated nitrogen loading factors. Applying these nitrogen loading factors to update an existing numerical model designed and calibrated by Questa 2005 for an earlier investigation, staff estimates that nitrogen loads released from OWDSs and transmitted via groundwaters to Malibu Lagoon total 30 ~~29 pounds per day (lb/day)~~. As a check, staff used the same flows and loading factors to a ‘spreadsheet’ model which characterized wastewater transport by hydrogeologic sector. Based on the ‘spreadsheet’ model, staff estimates that wastewaters transport 35 ~~36~~ lb/day into Malibu Lagoon.

Staff’s estimates of 2930 lb/day to 3635 lb/day from the numeric and ‘spreadsheet’ models are greater than two of the estimates (17 lb/day to 20 lb/day) prepared by the third parties in previous studies, and slightly overlap the estimate by the other third party (32 lb/day). Among the factors accounting for the range in estimates between staff’s estimates and third-party estimates are:

- Commercial Flows: The third-party models did not capture the entire OWDS inventory and used significantly lower assumptions for commercial wastewater flows.
- Nitrogen Concentrations – Residential: Two of the three third-party models assumed that residential wastewaters have nitrogen concentrations that are about one-half of what staff determined is a reasonable assumption.
- Nitrogen Concentration – Commercial: Staff determined that the average nitrogen concentration of commercial wastewater discharges has decreased since 2004, as OWTSS with greater treatment capabilities has been brought on-line. However, this declining trend in this subset of OWTSS is not great enough to meet the TMDL goal.

⁹ In the Malibu Creek Watershed Nutrient TMDL (March 21, 2003), the US EPA specifies a numeric target of 1.0 mg/l for total nitrogen during summer months (April 15 to November 15) and a numeric target of 8.0 mg/L for total nitrogen during winter months (November 16 to April 14). Significant sources of the nutrient pollutants include discharges of wastewaters from commercial, public, and residential land use activities. The TMDL specifies a load allocation for on-site wastewater treatment systems of 6 lbs/day during the summer months and 8 mg/L during winter months.

Regardless of differing assumptions and models used ~~in the estimates~~, all estimates – including those prepared by staff as well as past estimates prepared by third parties – indicate that nitrogen loads from OWDSs are significantly above the load allocation of 6 lb/day for OWDSs established in a TMDL for restoration of water quality and protection of beneficial uses in the Malibu Lagoon. Accordingly, staff concludes that OWDSs in the Malibu Civic Center area cumulatively release nitrogen at rates that contribute to eutrophication and impair aquatic life in Malibu Lagoon. ~~This conclusion is supported by staff's estimates ranging from 29 lb/day to 36 lb/day as well as third party estimates from 17 lb/day to 32 lb/day, all of which fail to meet targets established to restore water quality and protect beneficial uses in Malibu Lagoon.~~

Technical Memorandum No. 5: Dischargers with Unsuitable Hydrogeologic Conditions for High Flows of Wastewaters Resort to Hauling Liquid Sewage and Sludge to Communities that have Sewer and Wastewater Treatment Facilities.

Intensive land use activities on many properties in the Malibu Civic Center area generate wastewater flows at rates that exceed the capacity of OWDSs to transmit the wastewaters into the subsurface. While some dischargers are limited by treatment equipment that has inadequate capacity and/or treatment capabilities, many dischargers do not have adequate disposal capacity on their properties to transmit the wastewaters into the subsurface. Their disposal rates can be constrained not only by lack of space, or area, for on-site disposal fields, but by hydrogeologic constraints as well, such as a high water table or tight soils. Consequently, in order to avoid failure of the OWDSs, a significant number of large dischargers resort to hauling liquid sewage and sludge to communities that have infrastructure to accept their liquid wastes.

To quantify reliance on the practice of hauling, staff reviewed reports of self-monitoring, ~~which include summaries of off-site hauling~~, submitted by ~~ten~~20 large commercial dischargers. Based on volumes of waste generated, staff identified a subset of 13 of the 20 dischargers for further analysis. In 2008, these thirteen dischargers, whose activities generated a total of approximately 28 million gallons of wastewater (77,000 gpd), hauled almost 2 million gallons (5,500 gpd), or about 67%, of their raw sewage to off-site disposal facilities. Furthermore, staff quantified trends from 2004 through 2008, which indicate that these ~~ten~~13 dischargers ~~have~~ cumulatively increased their rate of wastewater generation by 4513% and their rate of hauling by 29%. (Staff was not ~~un~~able use existing data from dischargers to analyze seasonal hauling trends – e.g. hauling trends during the wet season, and also during warm summer holidays when populations have high peaks.)

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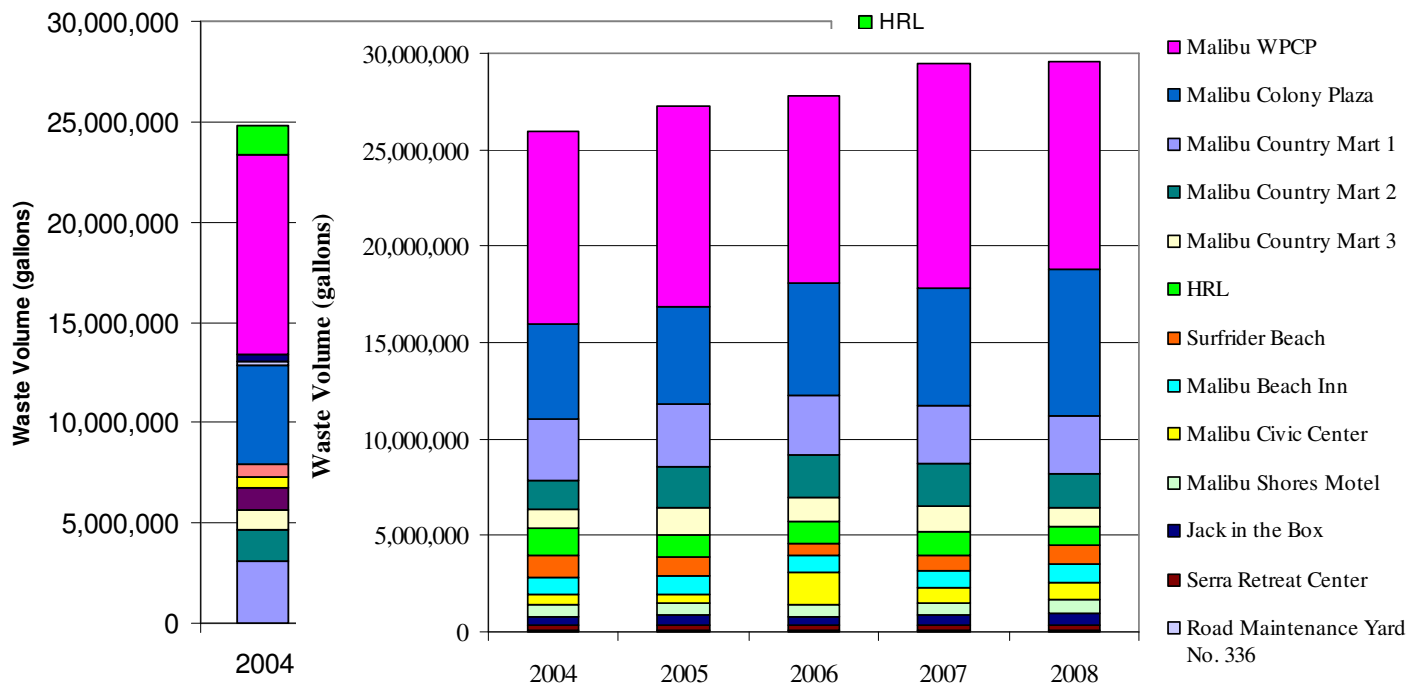
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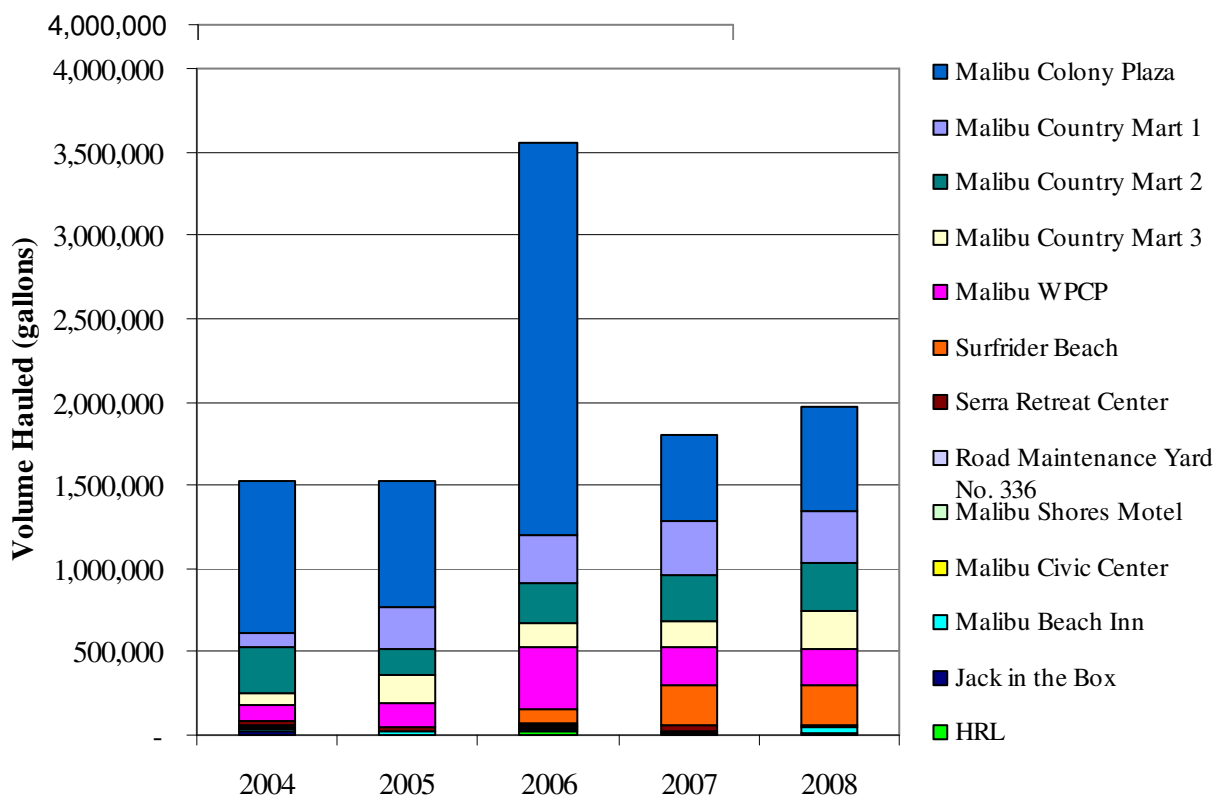
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Combined Annual Waste Flows for Select Dischargers



Combined Annual Septic Waste Hauling for Select Dischargers



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Staff also considered the carbon footprint of hauling practices, which generally use large diesel-powered tanker trucks that have to travel between 60 and 180 miles round trip to transport sewage. Staff estimates that hauling by these vehicles releases over 250 tons of carbon dioxide each year. Eliminating the need for sewage waste hauling would contribute toward the goals of California's Global Warming Solution Act ([AB 32, Pavley](#)) by decreasing greenhouse gas emissions. Also, elimination of excessive hauling can help reduce public nuisances, such as traffic, noise, and odor resulting from these practices.

Conclusions

Discharges of wastewaters to the subsurface through OWDSs have degraded water resources and impaired existing and potential beneficial uses of these waters, as determined by the following conclusions from the technical memoranda.

- i. Dischargers subject to Orders from the Regional Board that specify waste discharge requirements (WDRs) and Time Schedule Orders (TSOs) have poor records of compliance.
- ii. Discharges of wastewaters contain elevated levels of pathogens and nitrogen that impair the underlying groundwater as a potential source of drinking water.
- iii. Discharges of wastewaters to groundwater that is in hydraulic connection with beaches along the mouths of unsewered watersheds contain levels of pathogens that elevate risks of infectious disease for water contact recreation.
- iv. Discharges of wastewaters that flow through groundwater and recharge Malibu Lagoon transport a nitrogen load significantly in excess of the allocation in the TMDL established to restore water quality to a level sufficient to protect aquatic life and prevent nuisance resulting from eutrophication.
- v. Generation of wastewater flows in the Civic Center area has been increasing. On many sites, hydrogeologic conditions are unsuitable for high flows of wastewater, and many dischargers generate wastewater flows at rates that exceed their capacity to discharge on-site. These dischargers rely on pumping significant flows into tanker trucks that haul liquid sewage and sludge via public roadways to communities that have sewer and wastewater treatment facilities.

Recommendation

Staff recommends that the Regional Board adopt Resolution R4-2009-xx to immediately prohibit all future discharges of wastewaters and to prohibit existing discharges of wastewater ~~within five years of the Regional Board's adoption, i.e. by November 5October 1,~~ 2014.

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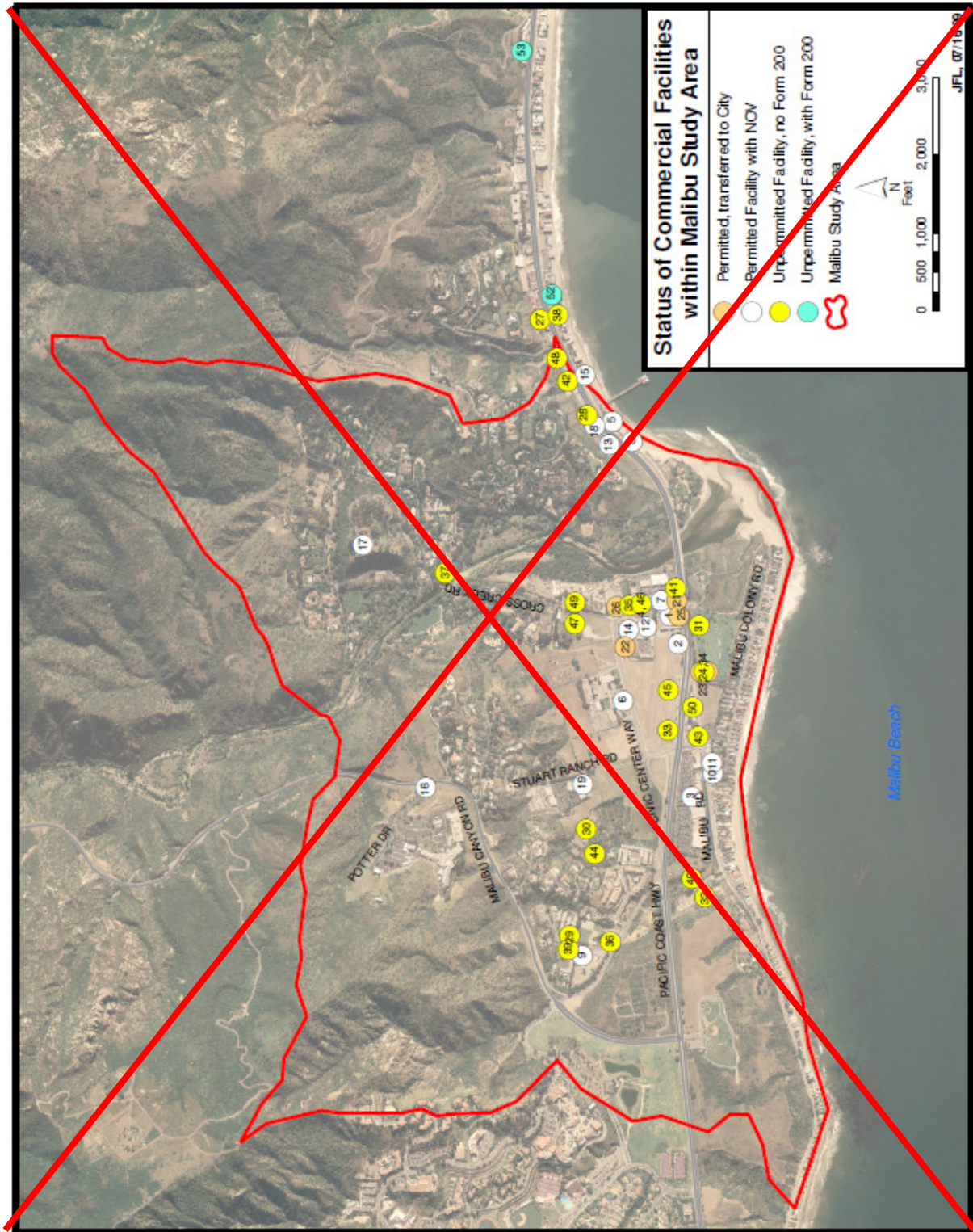
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Figure 1: Malibu Civic Center Area



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Technical Staff Report (Overview): Appendix – Findings

Staff has prepared a draft resolution to amend the *Basin Plan* to prohibit OWDSs, in order to protect the quality of water resources and to restore beneficial uses of water resources in the Malibu Civic Center area. In order to adopt this prohibition, the Regional Board must make several determinations, in accordance with the California Water Code (CWC) 13280. Also, staff considered factors set forth in CWC 13281¹ and other regulatory codes. This information is summarized below, organized by sections in the codes.

1. **CWC 13280² – Discharges from OWDSs violate water quality objectives and impair present or future beneficial uses of water:** As detailed in the technical staff report, staff demonstrates that OWDSs impair water resources as follows:

- Groundwater: In Tech Memo #2, staff evaluates nitrogen and pathogen levels in groundwater against drinking water standards, and concludes that OWDSs impair groundwater that the Board has designated as a potential source of drinking water.
- Beaches: In Tech Memo #3, staff demonstrates that pathogens released from OWDSs in hydraulic connection with the ocean impair swimming, surfing, and other recreational activities (e.g. wading).
- Lagoon: In Tech Memo #4, staff evaluates nitrogen levels from OWDSs in groundwater that is in hydraulic connection with Malibu Lagoon, and concludes that discharges from OWDSs fail to meet a load allocation of 6 pounds per day, specified in the nutrient TMDL in order to prevent accelerated eutrophication and restore aquatic and riparian habitat and wildlife.

Furthermore, as described in Tech Memo #1, many dischargers under Orders specifying Waste Discharge Requirements (WDRs) and Time Schedule Orders (TSOs) from the Board have failed to meet effluent limits that the Board set at levels protective of beneficial uses.

2. **CWC 13280 – Discharges from OWDSs cause nuisance:** As detailed in the technical staff report, staff demonstrates that OWDSs cause nuisance:

- Hauling: In Tech Memo #5, staff analyzes a subset of 13 dischargers who, due to relatively large flows coupled with unsuitable hydrogeologic conditions, hold their raw sewage for pumping into tanker trucks that haul the liquid wastes to other communities that have sewer and wastewater treatment facilities. This practices result in nuisance (odors and noise).³
- Additional Nuisances: At beaches, persistent failures to meet water contact standards result not only in elevated risks of human illness, but also in nuisance for beachgoers expecting to recreate

¹ 13281. (a) In making a determination pursuant to Section 13280, except as specified in subdivision (b), the regional board shall consider all relevant evidence related to the discharge, including, but not limited to, those factors set forth in Section 13241, information provided pursuant to Section 117435 of the Health and Safety Code, possible adverse impacts if the discharge is permitted, failure rates of any existing individual disposal systems whether due to inadequate design, construction, maintenance, or unsuitable hydrogeologic conditions, evidence of any existing, prior, or potential contamination, existing and planned land use, dwelling density, historical population growth, and any other criteria as may be established pursuant to guidelines, regulations, or policies adopted by the state board.

² 13280. A determination that discharge of waste from existing or new individual disposal systems or from community collection and disposal systems which utilize subsurface disposal should not be permitted shall be supported by substantial evidence in the record that discharge of waste from such disposal systems will result in violation of water quality objectives, will impair present or future beneficial uses of water, will cause pollution, nuisance, or contamination, or will unreasonably degrade the quality of any waters of the state.

³ Although staff also estimated the carbon footprint of hauling practices, staff did not quantify impacts to traffic from the tanker truck routes.

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in unpolluted waters. At Malibu Lagoon, odors and color problems from accelerated eutrophication can cause odor and color problems in and near the lagoon.

3. **CWC 13241(a) – Past, present, and probable future beneficial uses of water:** In analyzing evidence for a prohibition, staff relied upon designations of beneficial uses in the *Basin Plan*, as summarized below:
 - Groundwater, designated as a potential source of drinking water. Also, staff considered past uses of groundwater to meet historic demands for drinking water. Staff acknowledges that groundwater is not a current source of drinking water. Nevertheless, staff – in accordance with the Board’s designation of groundwater as a ‘potential’ source of drinking water and the State Board’s *Sources of Drinking Water Policy* – considered the potential for groundwater to be used as a future source of water to meet a portion of the community’s demand, or to meet demand in times of emergency. (See Tech Memo #2.)
 - Malibu Lagoon, designated for providing habitat for aquatic life and wildlife. Also, staff considered recent regulatory actions that designated (in accordance with section 303(d) of the Clean Water Act) this waterbody as impaired, and that allocated loads from all significant point and nonpoint sources, including OWDSs. (See Tech Memo #4.)
 - Malibu Beach, Malibu Lagoon Beach (Surfrider), and Amarillo Beach, designated for water contact recreation. Also, staff considered recent regulatory actions that designated Malibu Beach and Surfrider Beach as impaired, and that specified dry and wet weather pathogen loads. (See Tech Memo #3.)
4. **CWC 13241(b) – Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto:** Staff considered environmental characteristics, including water quality and impairments to beneficial uses, throughout the technical and environmental staff reports and also in previous regulatory actions by the Board and US EPA to designate beneficial uses and establish water quality objectives, to designate impaired waters, and to issue TMDLs.
5. **CWC 13241(c) – Water quality conditions that could reasonably be achieved through coordinated control of all factors which affect water quality in the area:** In previous regulatory actions by the Board and US EPA, strategies to control pollutants from point and nonpoint sources were considered.
 - In the nutrient TMDL for Malibu Lagoon, numeric targets are established for all significant sources of nitrogen, including a numeric target of six pounds per day from OWDSs. (See nutrient TMDL for numeric targets for all significant sources of nitrogen; see Tech Memo #4 for an evaluation of nitrogen released from OWDSs.)
 - The Santa Monica Bay Beaches Bacterial TMDLs require responsible agencies to achieve the numeric targets and waste load allocations for fecal indicator bacteria at the beaches through implementation of coordinated control strategies to address all bacterial sources. In the administrative records for the TMDLs, the Regional Board identifies myriad point and nonpoint sources of fecal indicator bacteria to the beaches, including sanitary sewer and sewage plant overflows and spills, septic systems, urban runoff, animal fecal matter, illegal discharges from boats, and illicit discharges from private drains among other sources. The Regional Board anticipated that responsible agencies would employ a variety of control strategies, including diverting storm drain flows to treatment plants, where possible; controlling sources of bacteria, including groundwater sources such as from malfunctioning or improperly placed septic systems; eliminating illicit discharges; or implementing “end-of-pipe” treatment to address these sources and, ultimately, achieve the TMDL targets.

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6. **CWC 13241(d) – Economic considerations:** This section requires consideration of costs associated with establishment of water quality objectives. The proposed prohibition does not establish water quality objectives – rather, it is a proposed action to achieve existing objectives. Nevertheless, staff analyzed the costs of possible projects that the city, a utility, or a water authority could implement to comply with the prohibition. These projects, which were evaluated on a conceptual basis, have estimated costs ranging from \$17 million to \$80 million. (See Environmental Staff Report, section entitled Summary of Economics.)
 7. **CWC 13241(e) – Need for developing housing within the region:** Although staff did not find that there is a need to develop additional housing in the City of Malibu, staff did consider impacts to housing that could arise from projects constructed to comply with the prohibition deadline. (See Environmental Staff Report, Environmental Checklist, Item 12.)
 8. **CWC 13241(f) – Need to develop and reuse recycled water:** Although through this regulatory action the Regional Board is not determining method of compliance, staff assumed that the community would recycle as much treated wastewater as possible in planning and designing a project to achieve compliance with the prohibition. (See Environmental Staff Report, section entitled Options for Compliance Projects including Summary of Economics, and the Environmental Checklist, Item 3.)
 9. **CWC 13281 – Health & Safety Code, section 117435, providing health officers with the authority to require reports from businesses that clean septic tanks, seepage pits, and cesspools:** Staff consulted with the health officer for the County of Los Angeles to get this information, and determined that the County does not require reports on the location of septic tanks/seepage pits/cesspools being cleaned, the locations of the disposal points, the frequencies of cleanouts, and any observed violations.⁴ In the past, the County did require such reports. However, due to limited resources, the County has had trouble reviewing all reports and, as a result, dropped the requirement for submittal for the past two years. The health officer still requires an annual inspection of all registered tanker trucks. (See Tech Memo #5, section entitled ‘Septic Pumping and Hauling Regulations.’)
- Staff did have access, in Regional Board files, to pumping and hauling information for many of the dischargers who operate under WDRs specified in Orders issued by the Board. In Tech Memo #5 staff compiled and considered this information, and concluded that a high level of pumping and hauling occur due to limitations of treatment systems or hydrogeologic limitations, or both, that preclude on-site disposal.
10. **CWC 13281 – Possible adverse impacts if the discharge is permitted:** Swimmers are already exposed to elevated health risks at beaches in the Civic Center area. Habitat in Malibu Lagoon is already degraded by accelerated eutrophication. Much of the groundwater in the area fails to meet standards for drinking water. Continued and/or additional discharges will further pollute these water resources and be inconsistent with goals of the *Basin Plan* and other state plans and policies. In the Technical Staff Report as well as though previous regulatory actions by the Board, staff has demonstrated adverse impacts to the following water resources:

⁴ Staff is aware that the City provides contact information for five hauling firms, registered with the County; however, the City does not endorse any of these firms. Also, the City provides recommendations for pumping frequencies for properly functioning OWDSs. The City does not require ‘section 117435’ information (paragraph above), as this oversight would duplicate the County’s oversight. Also, concerns have been raised by the City about the transporters’ level of cooperation in providing such information to the City, as well as privacy issues.

- Groundwater: Pollution from OWDSs violates water quality objectives for drinking water use.⁵ (See Tech Memo #2.)
- Malibu Beach, Malibu Lagoon Beach (Surfrider), and Amarillo Beach: Pollution from OWDSs in hydraulic connection with these beaches is a significant source of impairment to water contact recreation.⁶ (See Tech Memo #3.)
- Malibu Lagoon: Pollution from OWDSs in hydraulic connection with the lagoon impairs aquatic and wildlife beneficial uses fails to meet a pollutant load for nitrogen is impaired by nitrogen from OWDSs as well as other sources.⁷ (See Tech Memo #4.)

11. **CWC 13281 – Failure rates of any existingsystems whether due to inadequate design, construction, maintenance, or unsuitable hydrogeologic conditions:** All 20 dischargers subject to Orders issued by the Board have violated those Orders at least once during the period from the fourth quarter of 2004 through the fourth quarter of 2008 (except Malibu Lumber, which didn't start discharge until April 2009⁸). While a few of the violations were for reporting problems (e.g. late submittal of a monitoring report), most were for serious violations, such as failure to meet pollutant concentration limits that the Board sets at levels protective of beneficial uses. Failure to meet limitations on flow is another example of serious violations, and indicates design limitations and/or siting and hydrogeologic limitations.

Dischargers also experience start-up and maintenance problems, as indicated in reports of self-monitoring and the record of violations. (See Tech Memo #1.) A recent example is Malibu Lumber, which started treatment and discharge in April 2009. The discharger has experienced many unanticipated start-up problems. (See Tech Memo #1.) The discharger has yet to achieve full compliance with its WDR.

Many dischargers resort to a high level of pumping and hauling (almost 2 million gallons per year, from a subset of 13 dischargers) due to the limitations of treatment systems or hydrogeology, or both, which preclude on-site disposal. Such pumping and hauling practices have been needed to prevent further stress on sites and systems that already fail to properly function for the flow of wastewater generated from on-site activities, especially during periods of peak activity, such as summer weekends and holidays. (See Tech Memo #5.)

12. **CWC 13281 – Evidence of existing, prior, or potential contamination:** For Malibu Lagoon, the Board has already considered evidence of impairment, and designated that waterbody as impaired. (See 303(d) list.) Furthermore, targets for nitrogen loads have been allocated through a TMDL for nitrogen loads from various sources, including OWDSs. (See Malibu Lagoon nutrient TMDL.) In Tech Memo #4, staff demonstrates that nitrogen loads from OWDSs far exceed the TMDL target.

For Malibu Lagoon (Surfrider) Beach and Malibu Beach, the Board already considered evidence of impairment from pathogens, and designated these beaches as impaired. (See 303(d) list.) The Board already set dry weather targets for these beaches through a TMDL for pathogens TMDL. In

⁵ See the *Basin Plan*, in which the Board designates groundwater as 'potential MUN;' the State Board 'Sources of Drinking Water Policy'⁵; and Tech Memo #2, in which staff presents evidence that groundwater fails to meet MCLs for nitrate, nitrite, and pathogens.

⁶ See the *Basin Plan*, in which the Board has designates water contact recreation as a beneficial use for these beaches; the 303(d) list, in which the Board and US EPA designate these beaches as impaired; the beach pathogen TMDL, in which the Board specifies dry and wet weather targets for pathogens; and Tech Memo #3, in which staff presents evidence of impairment to water contact recreation activities from OWDSs.

⁷ See the *Basin Plan*, in which the Board has designates aquatic and wildlife beneficial uses for the lagoon; the 303(d) list, in which the Board and US EPA designate Malibu Lagoon as impaired; and the nutrient TMDL for the lagoon, in which the Board allocates nitrogen loads for various sources of nitrogen, including OWDSs.

⁸ Malibu Lumber, since beginning discharge in April 2008, also has a record of serious violations of its WDR.

Tech Memo #3, staff demonstrates that pathogen indicators released from OWDSs in hydraulic connection with beaches fail to meet water contact recreation standards and the dry weather target.

For groundwater, comments were received regarding seawater intrusion into groundwater resources, and staff acknowledges that seawater intrusion may have contributed to degradation of water quality (along with other sources of pollutants, such as OWDSs). Nevertheless, such problems do not preclude restoration of water quality. And in restoring water quality, staff is not suggesting that it is feasible for groundwater resources to completely replace the City's other supplies of drinking water. Rather, staff suggests that groundwater could meet a portion of drinking water demand, and could also serve as an emergency supply of water in the event that deliveries of imported water were interrupted. In restoring and managing potential future groundwater production, the storage and operational yield of the aquifer should be evaluated, and community leaders should ensure that pumping patterns and replenishment with high quality waters are properly designed and managed. Early studies of water resources were of limited scope, and past production of groundwater does not appear to have been managed in a manner to establish sustainable pumping patterns and sources of replenishment, in order to prevent over-pumping of the aquifer and degradation of water quality from seawater intrusion and discharges of wastewaters.

13. **CWC 13281 – Existing and planned land use and dwelling density:** The entire prohibition area covers 2.2 square miles, and includes approximately 400 dischargers who cumulatively generate wastewater at a rate of about 270,000 gallons per day (gpd).

Staff did not average the total existing flow over the entire 2.2 square miles. Most activity and the flows generated from these activities are concentrated along the beach and in the Civic Center area, which serves as the core of the City's business and civic activities. (See Tech Staff Report – Overview, sections entitled Introduction and Prohibition Boundary, and Tech Memo #4.) Many of the existing commercial dischargers already exceed flow limits established in WDRs. (See Tech Memo No. 1.) Many of these dischargers rely on hauling their wastewaters off-site. (See Tech Memo No. 5.) In lower Winter Canyon, high density development – namely four multi-family units – generate significant flows that rely on the Malibu Water Pollution Control Plant, a small, high-cost plant that has a problematic compliance history. (See Tech Memo #1.) Lower Winter Canyon also receives flows of wastewater from the coastal area, namely Malibu Colony Plaza, which lifts its wastewater over to four acres in Winter Canyon.

Significant properties in the City's core may be developed in the future, including La Paz and Malibu Towing; activities on these future developments may generate additional flows. Significant redevelopment also may occur in the future; intensified activities from redevelopment will likely generate additional flows. For example, Malibu Lumber is expected to generate up to 17,000 gpd – over a ten-fold increase in flows from the previous site activities.

14. **CWC 13281 – Historical population growth:** A census value is not available for the population within the prohibition boundary, and staff initially estimated the current residential population at about 1,000.⁹ Staff revised this estimate to almost 2,000, using information on buildings, such as numbers of bedrooms and bathrooms (see Tech Memo #4, Table 2). Also, staff used information on wastewater flows (see Tech Memo #4, Table 1) as a rough cross-check of the population estimate. See also the Environmental Staff Report, section on Growth-Inducing Impacts. Staff also considered trend data (see Tech Memo #5, Appendix E), available for the City as a whole.

⁹ Staff's population estimate of 1,000, presented in the July 31, 2009 drafts, was based on information in Stone, *Final Report – Risk Assessment of Decentralized Wastewater Treatment Systems in High Priority Areas in the City of Malibu, California*, 2004, funded by the Santa Monica Bay Restoration Commission and the California State Coastal Conservation.

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and determined that, as with many areas in the County, Malibu has experienced growth; since 1990, prior to incorporation of the area that would become the City of Malibu, the population increased by 30%, from 10,500 to 13,700¹⁰ in 2008 – an annual growth rate of 1.5%.

Furthermore, the population estimate of 2,000 does not include daytime and evening visitors who use the beaches and patronize the businesses and public facilities in the area. The visitor population appears to be substantially increasing, as indicated by beach activity statistics for beaches – e.g. beach activity (throughout the area – not just limited to the prohibition area) appears to be increasing at an annual rate of 6% based on an increase in monthly beach counts from 233,500 in August 1999 to 355,000 in August 2006. (See Tech Memo #3, Appendix E.) Although the monthly totals are for all Malibu area beaches, staff believes that it is likely that beach activity for the beaches in the Civic Center area have shown a similar – and likely greater – increase, given the proximity of commercial and public facilities in the area.

Nor do the above population estimates include daytime and evening workers employed in the Malibu Civic Center area. As indicated by increasing wastewater flows from 13 commercial and public facilities (see Tech Memo #5, Figure 2), economic activity in the Civic Center area appears to be increasing with intensified development. Rates for discharges of wastewater will likely increase with intensified development – e.g. the redevelopment of the Malibu Lumber site which, when fully operational, is expected to discharge up to 17,000 gallons per day (over a ten-fold increase from the prior activity on the site).

Staff also considered growth inducing impacts. (See Environmental Staff Report, CEQA Analysis, section entitled Other Environmental Considerations.)

15. **CWC 13282 – Has an authorized public agency provided satisfactory assurance that systems will be appropriately designed, located, sized, spaced, constructed, and maintained?**
No – The City has not given such assurance to the satisfaction of the Regional Board. However, the City has commented that it believes it can provide the assurances required by this section, as summarized below.

- The City has started a wastewater management database.¹¹ However, staff has expressed concerns to the City of Malibu about the accuracy of information identifying each property listed in IWIMS, and also the extent to which entries for each property have been populated with data needed to regulate discharges to achieve protection of both public health as well as the quality of underlying groundwater and nearby surface waters. (See attachments to Tech Memo #1, letters dated May 28, 2009 and June 23, 2009.)
- The City discussed, during the October 2008 public meeting of the Board, an Operating Permit Program initiated as of March 10, 2008 and other terms of the MOU. The Board directed staff to prepare a prohibition. Concurrent with staff efforts to prepare a prohibition, a meeting to discuss the MOU was held among three Regional Board members, including the Chair, and City officials. However, there was no progress towards re-negotiating the MOU.

¹⁰ The 2008 population estimate is for the entire City of Malibu, not just the Malibu Civic Center area.

¹¹ IWIMS – Integrated Wastewater Information System.

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